Chapter 4, Tissues, Part 2

- *Histology* = The study of tissues
- *Tissue* = A collection of cells that perform related functions, and are similar in structure

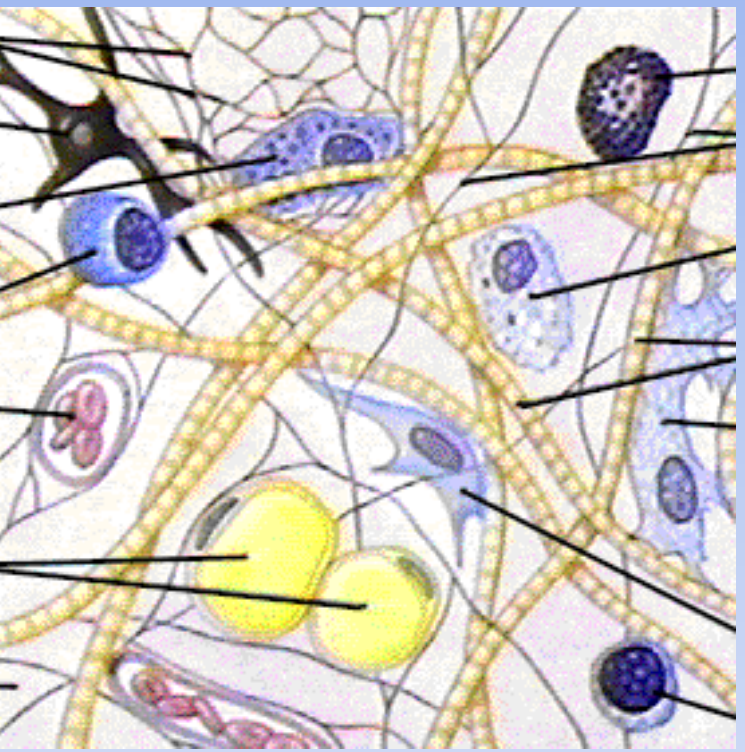
- *The Four Primary Tissue Types:*
  - Epithelial
  - Connective
  - Muscular
  - Nervous

Developed by
John Gallagher, MS, DVM

LAS POSITAS COLLEGE

Connective Tissue:

Supports, protects, binds tissues



Structural characteristics:

- **Specialized cells, few in number**
- **<u>Extracellular matrix</u>**
  - **fibers (collagen)**
  - **Ground substance (fluid-like)**

- ***The Four Primary Tissue Types***
  - **Epithelial**
  - **Connective**
  - **Muscular**
  - **Nervous**

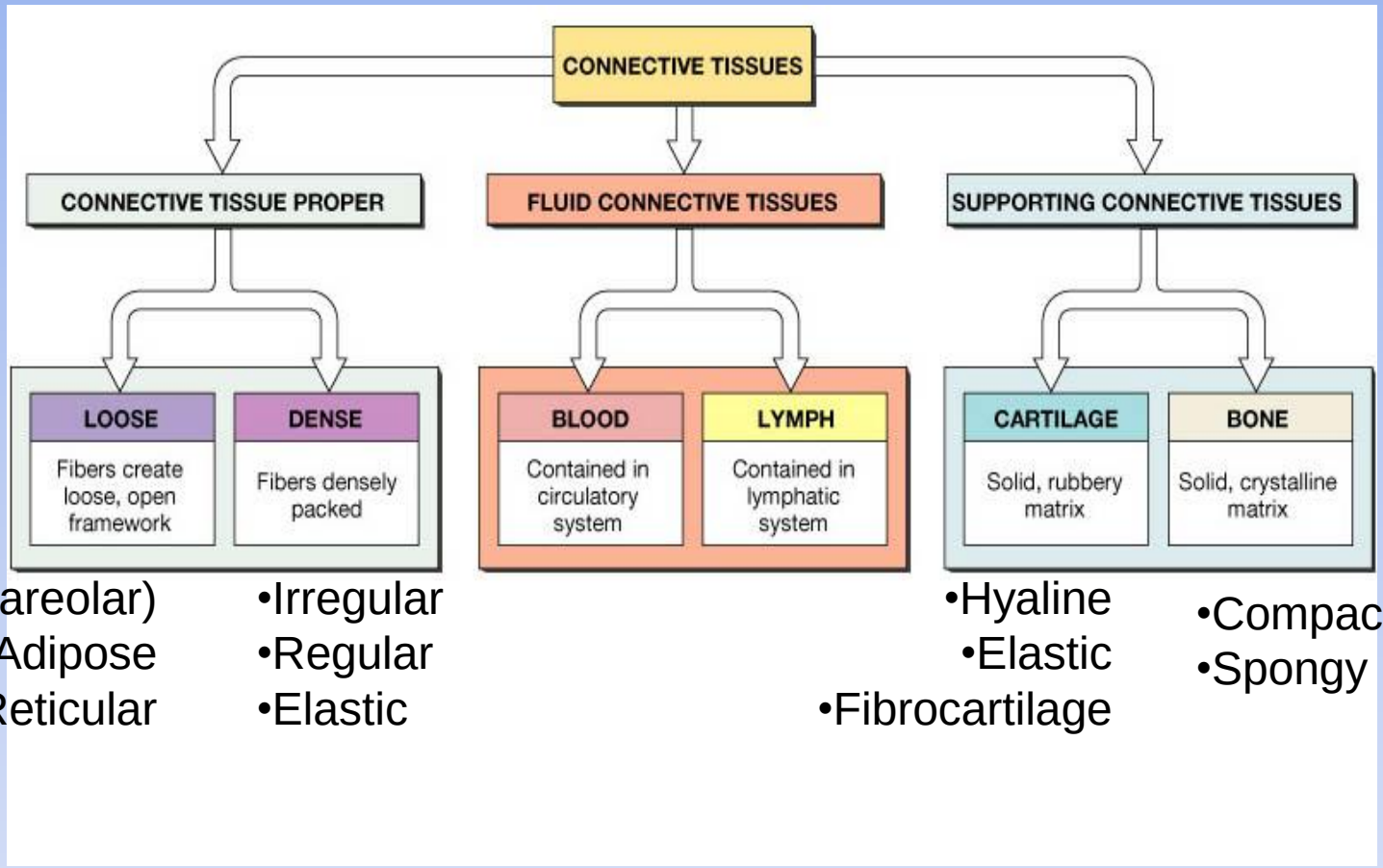
Functions of C.T.

- Structural framework for body
- Transport of fluids and dissolved materials
- Support and protection for organs
- Energy storage (fat)
- Defense

•*The Four Primary Tissue Types*

Epithelial
Connective
Muscular
Nervous

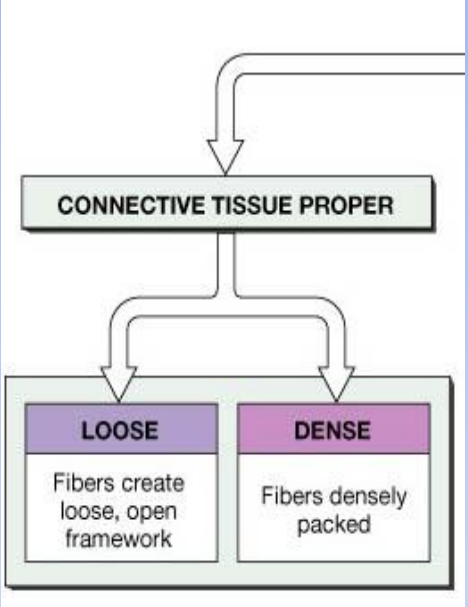
Classification of Connective Tissue



- Loose (areolar)
- Adipose
- Reticular
- Irregular
- Regular
- Elastic
- Hyaline
- Elastic
- Fibrocartilage
- Compact
- Spongy

This is similar to Table 4.2

Connective Tissue Proper

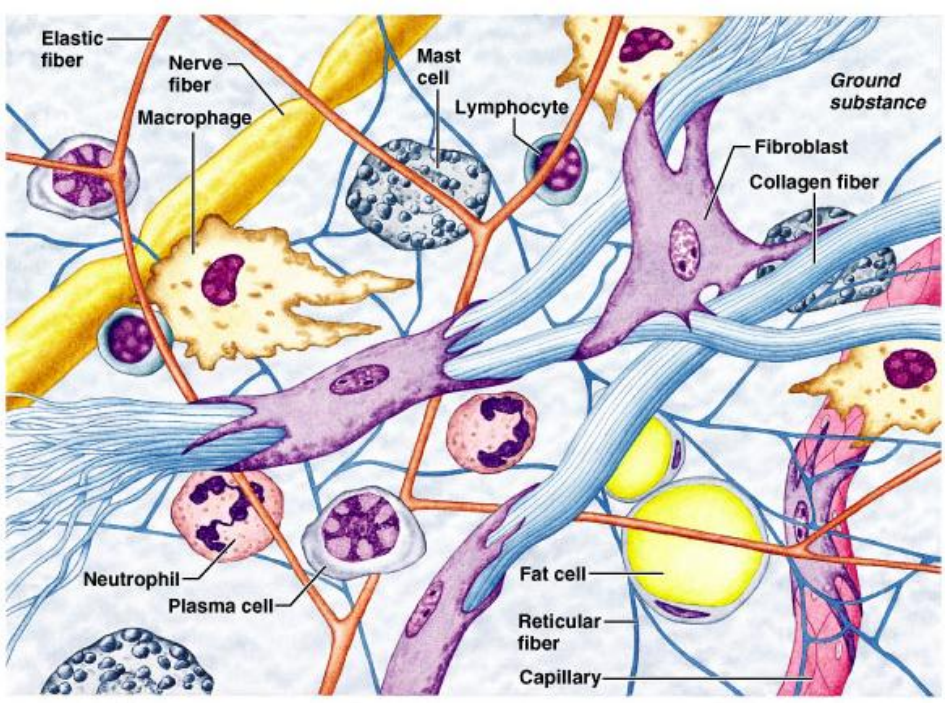


Loose Connective tissue

- **- viscous EC matrix, fibers not aligned**
    1. **loose (areolar) C.T.**
    2. **adipose**
    3. **reticular**

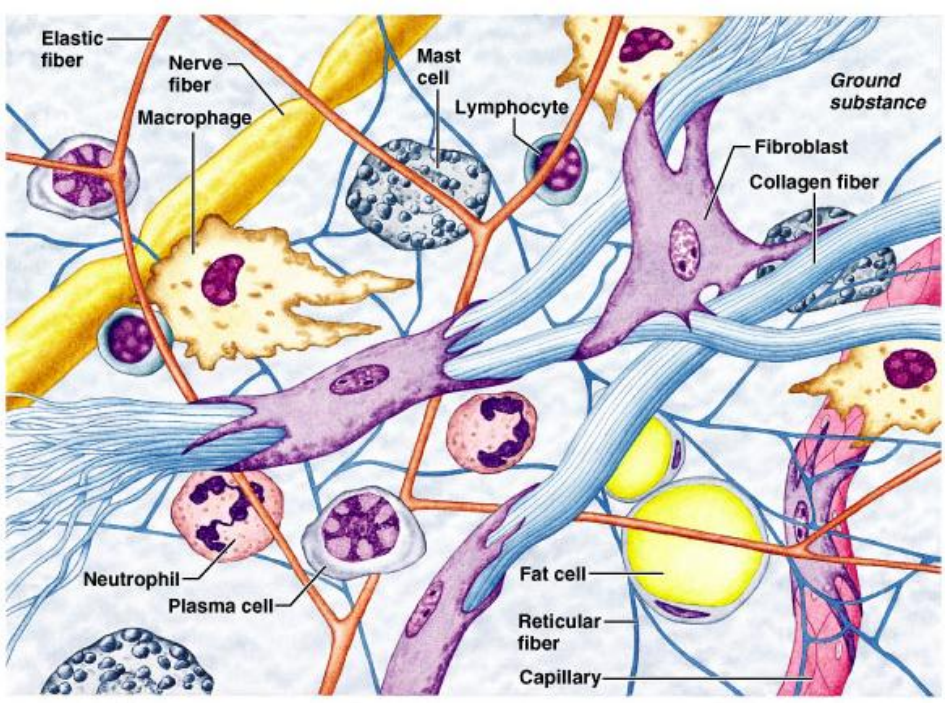
1. Areolar (AKA loose)

- Most widespread
  - Beneath most epithelia
  - Think dermis!!!
- Types of Fibers:
  - Collagen
  - Elastic
  - Reticular



1. Loose (areolar)

- Ground Substance
  - Similar to plasma
  - Leaked from capillaries
  - AKA ECF, interstitial fluid
- Defense:
  - Macrophages
  - Plasma Cells
  - Mast Cells
  - Other WBC

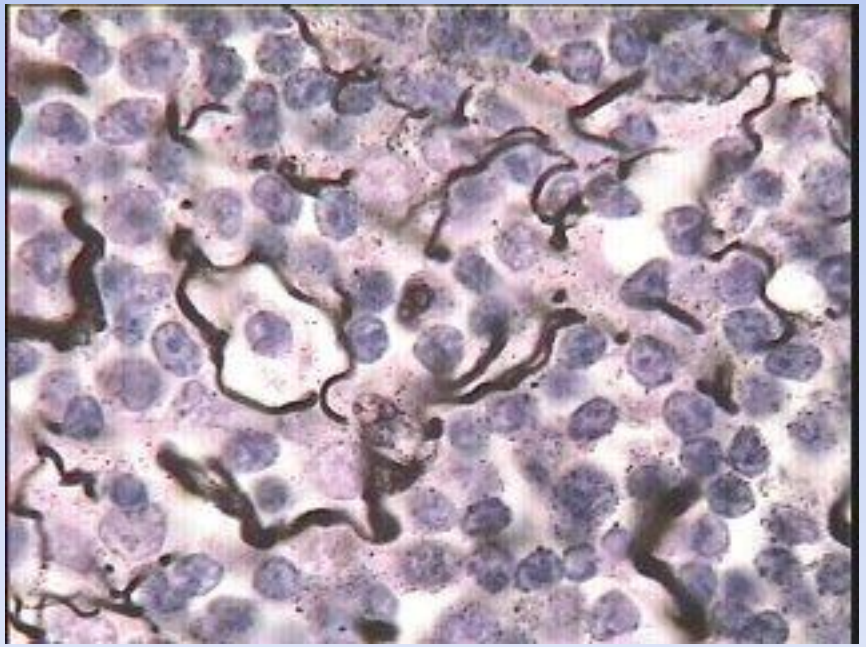


2. Fat

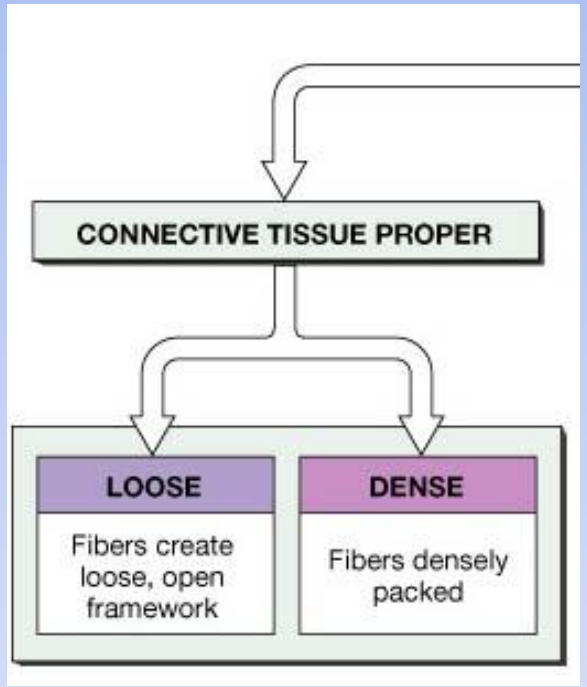
- AKA adipose
  - Cells are swollen with fat
- Prominent in hypodermis
- Intercellular matrix is obscured
- Storage of energy

3. Reticular

- Resembles areolar CT, but
  - Reticular fibers only
- “reticulum” = network
- Bone marrow, spleen

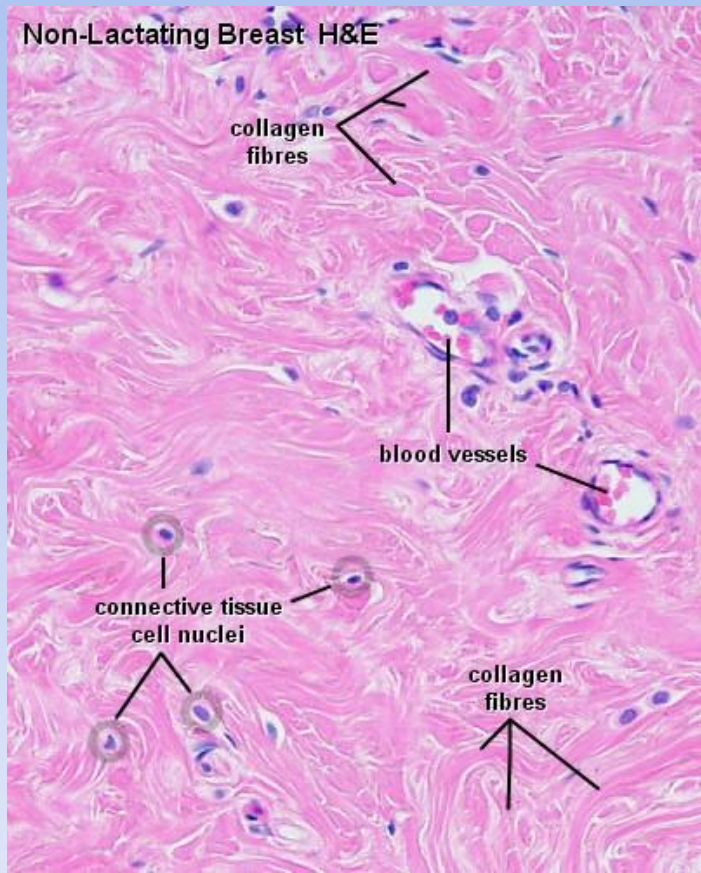


Dense Connective Tissue



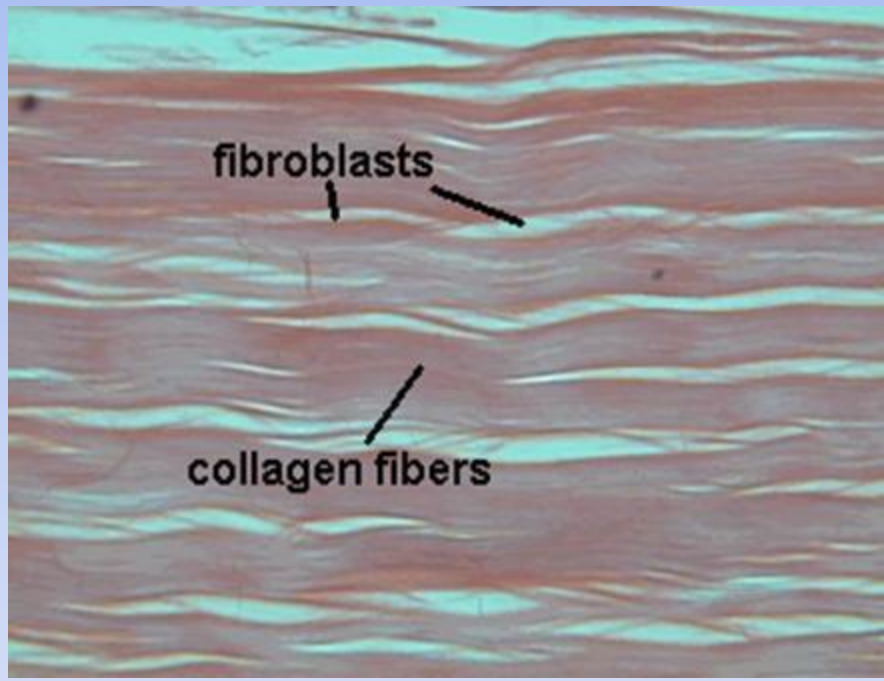
1. Dense Irregular C.T.

- Collagen fibers in many directions
- Resist multi-directional tension
- Joint capsules



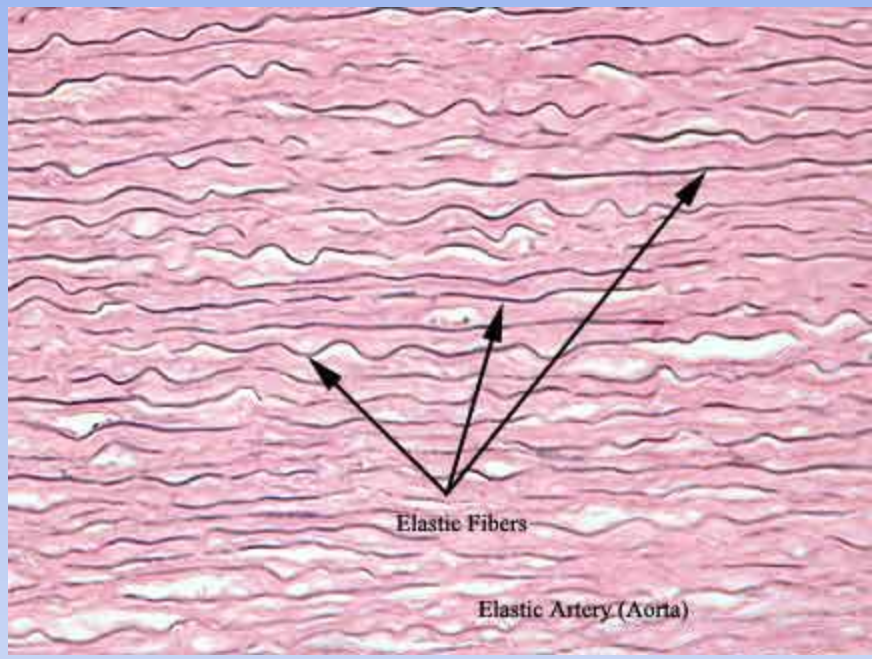
2. Dense Regular C.T.

- Very parallel fibers of collagen
- Tendons

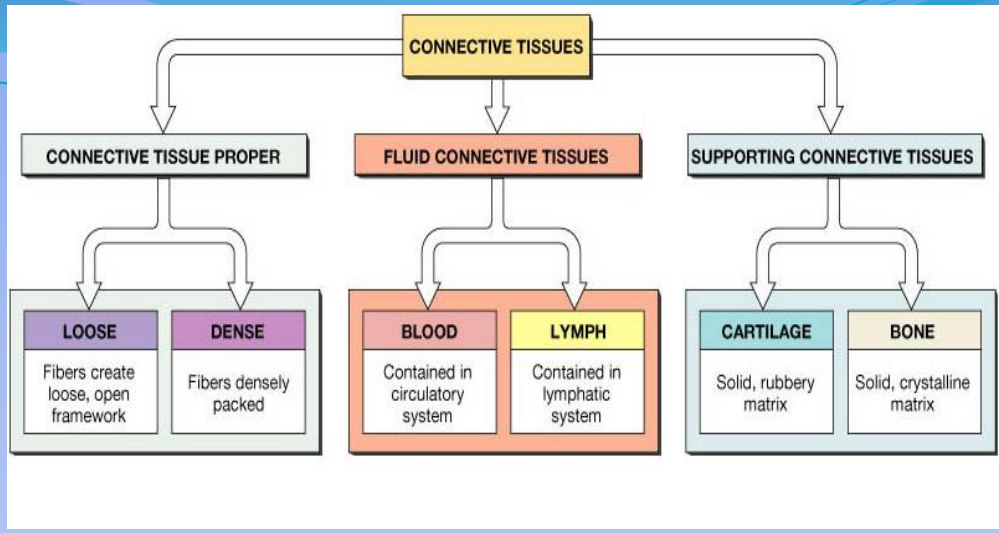


3. Elastic C.T.

- Elastic fibers > collagen
- Arterial walls



Supporting C.T.

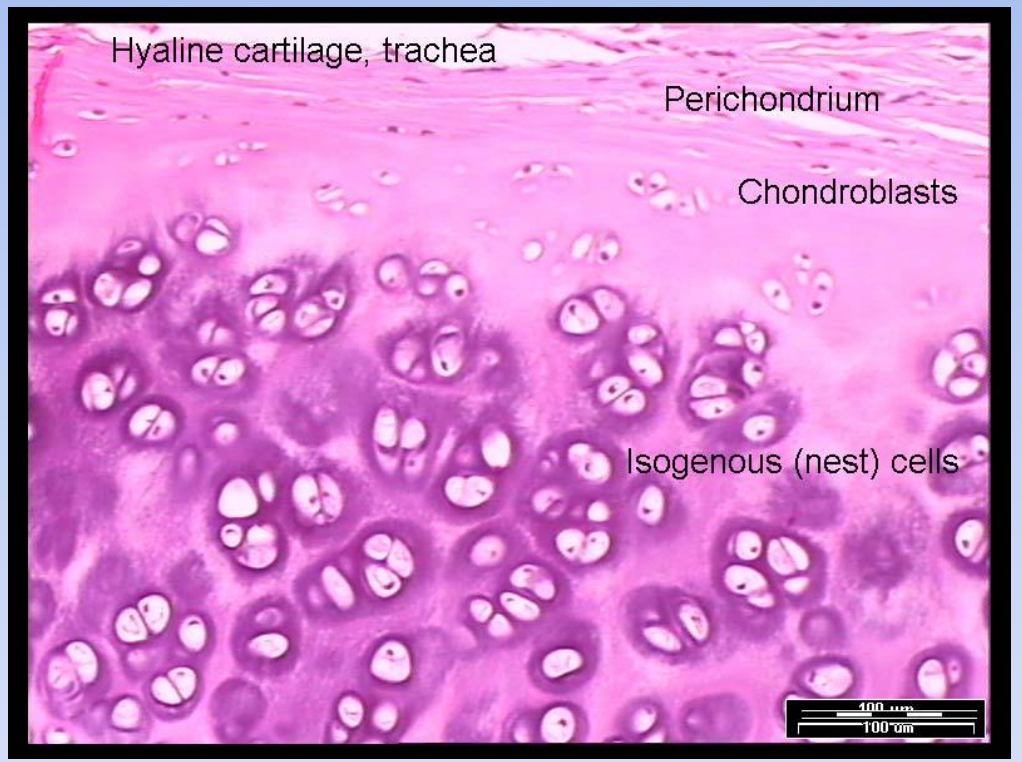


- Cartilage
  - Hyaline
  - Elastic
    - Ear, larynx
  - Fibrocartilage
    - Intervertebral discs
- Bone (Chapter 6)
  - Mineral matrix

Check Chapt 6, p 125

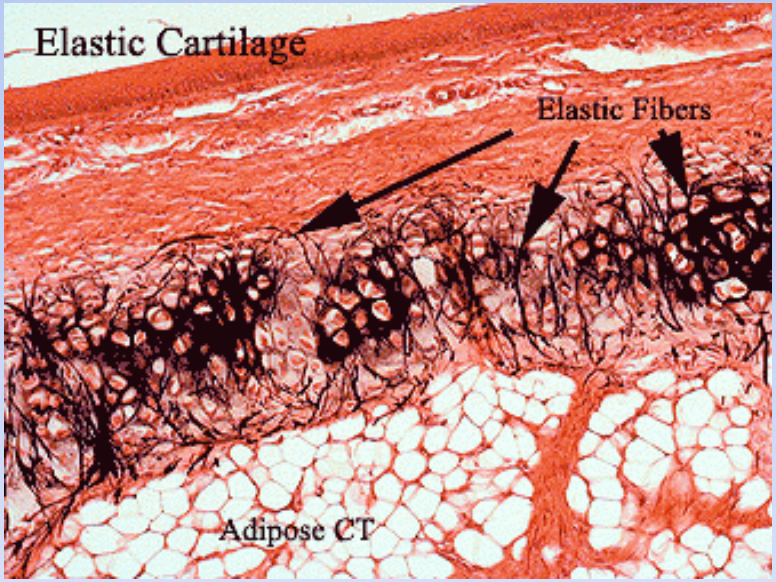
Hyaline Cartilage

- I.C. Matrix appears homogeneous
- Chondroblasts and chondrocytes in lacunae
- Articular cartilage
- Tracheal rings



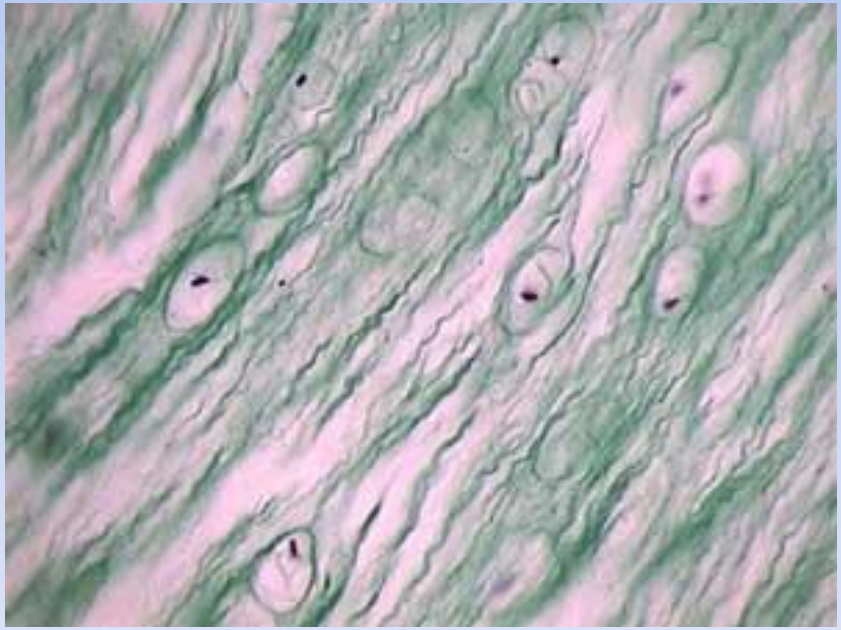
Elastic cartilage

- More elastic fibers
- Ear



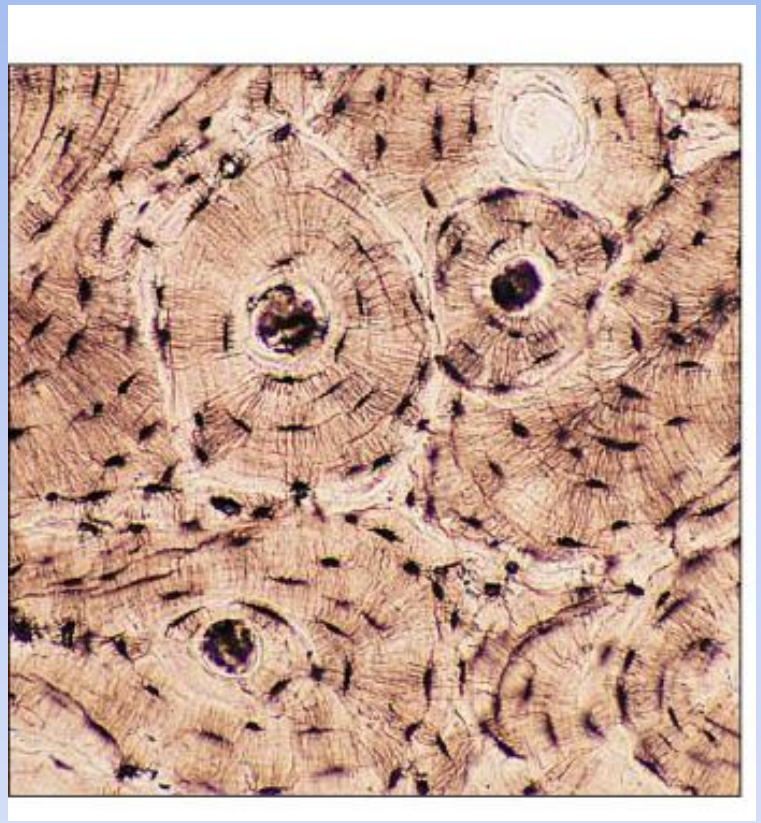
Fibrocartilage

- IV disk
- Symphysis pubis
- Meniscus

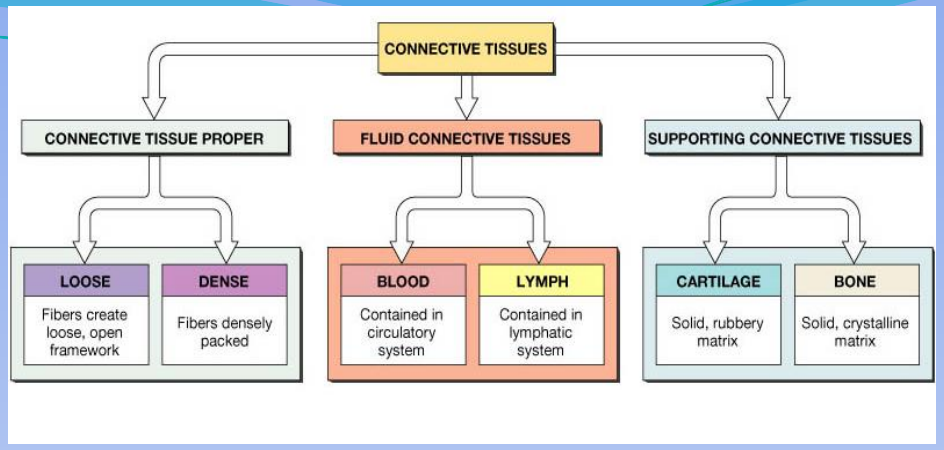


Bone (chap 6)

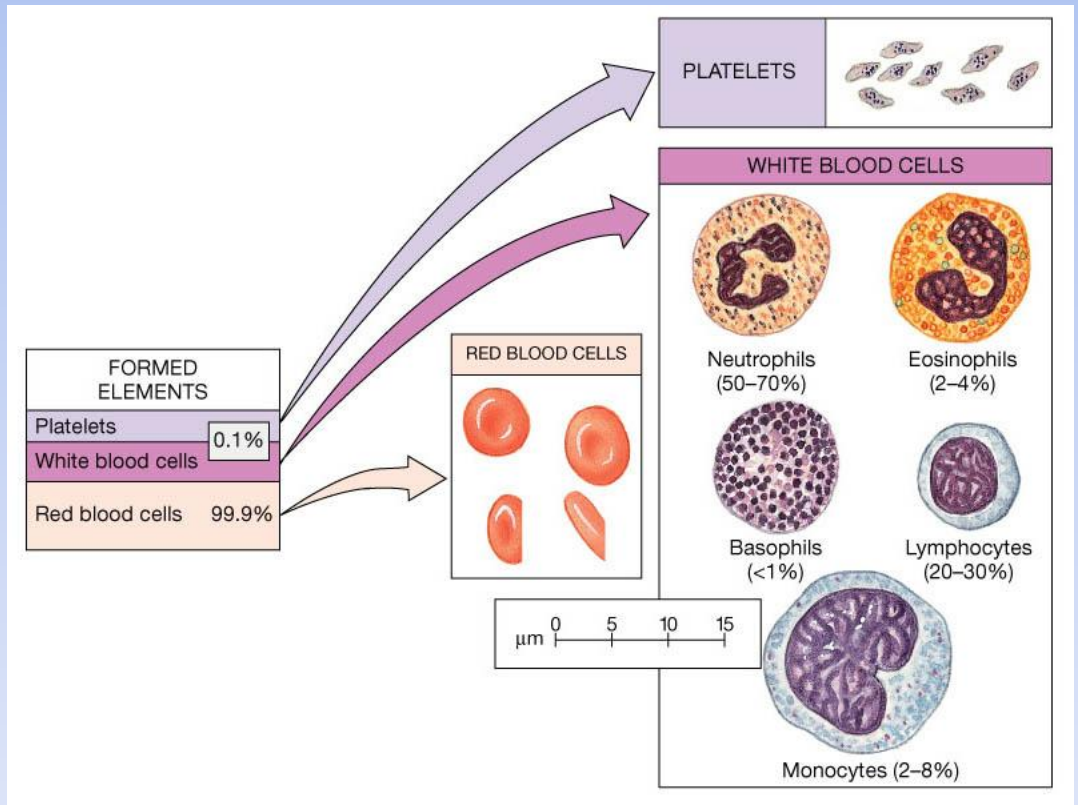
- The E.C. matrix is mineral, not fibrous



Fluid C.T.



- Blood (Ch 17)
- Lymph (Ch 20)



Membranes = Combination of Epithelia & C.T. (p 88)

Mucous membranes,

- **Lining of cavities that communicate with exterior**

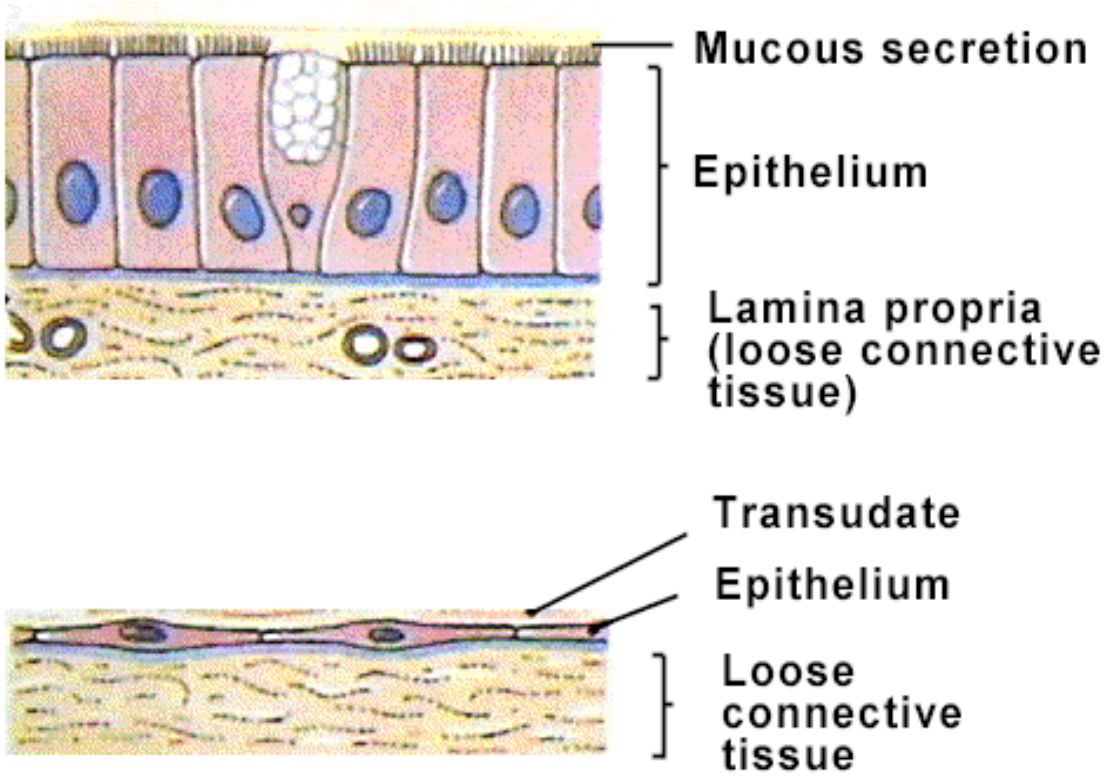
- **Serous membranes,**
  - **Lining of sealed, internal cavities**
- **Cutaneous membranes,**
  - **Skin**
- **Synovial membranes,**
  - **Joints**

Know special names of serous membranes depending on location

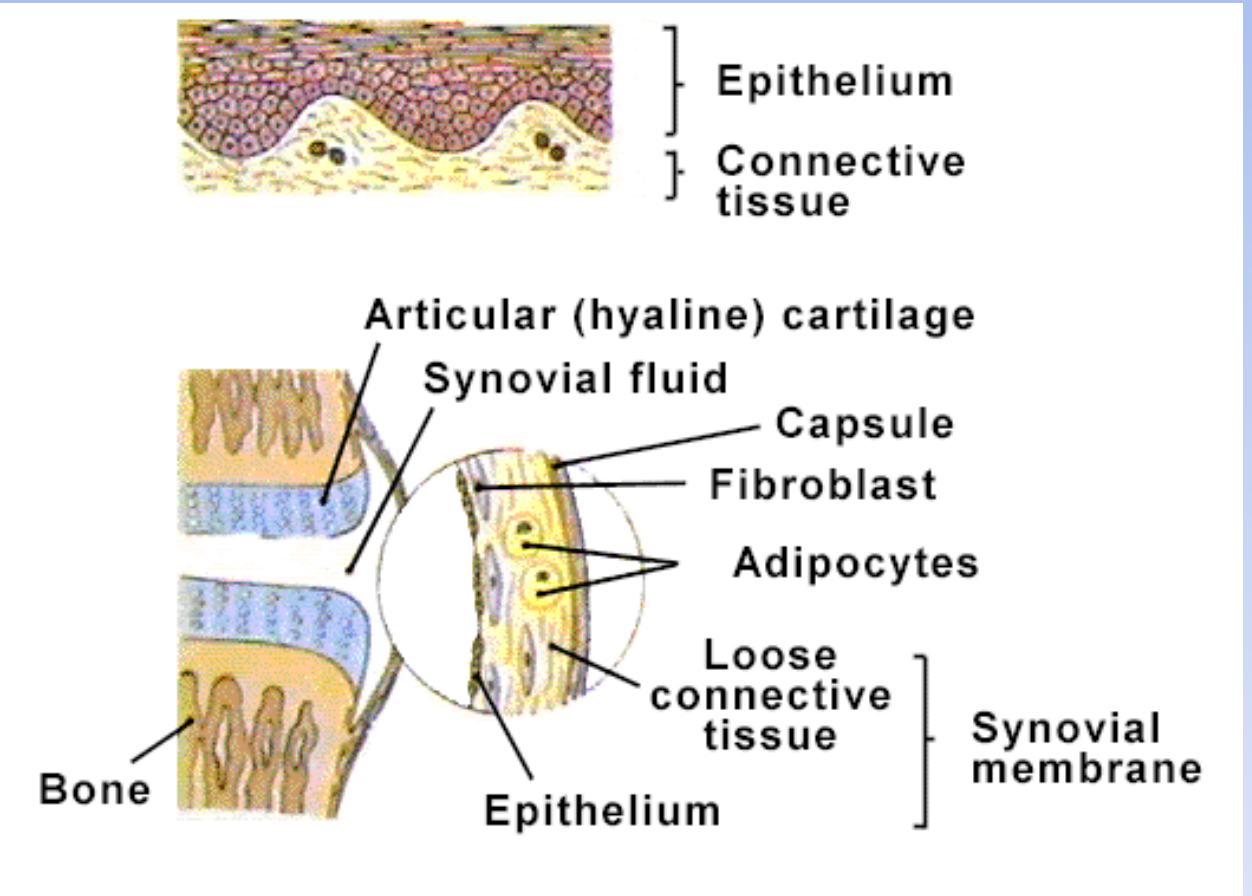
Also know difference between “parietal” and “visceral”

Mucous vs. Serous Membrane

AKA mucosa

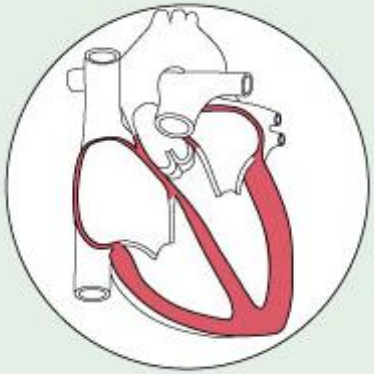


Cutaneous (skin) & Synovial Membranes



Muscle Tissue Three types:

Skeletal



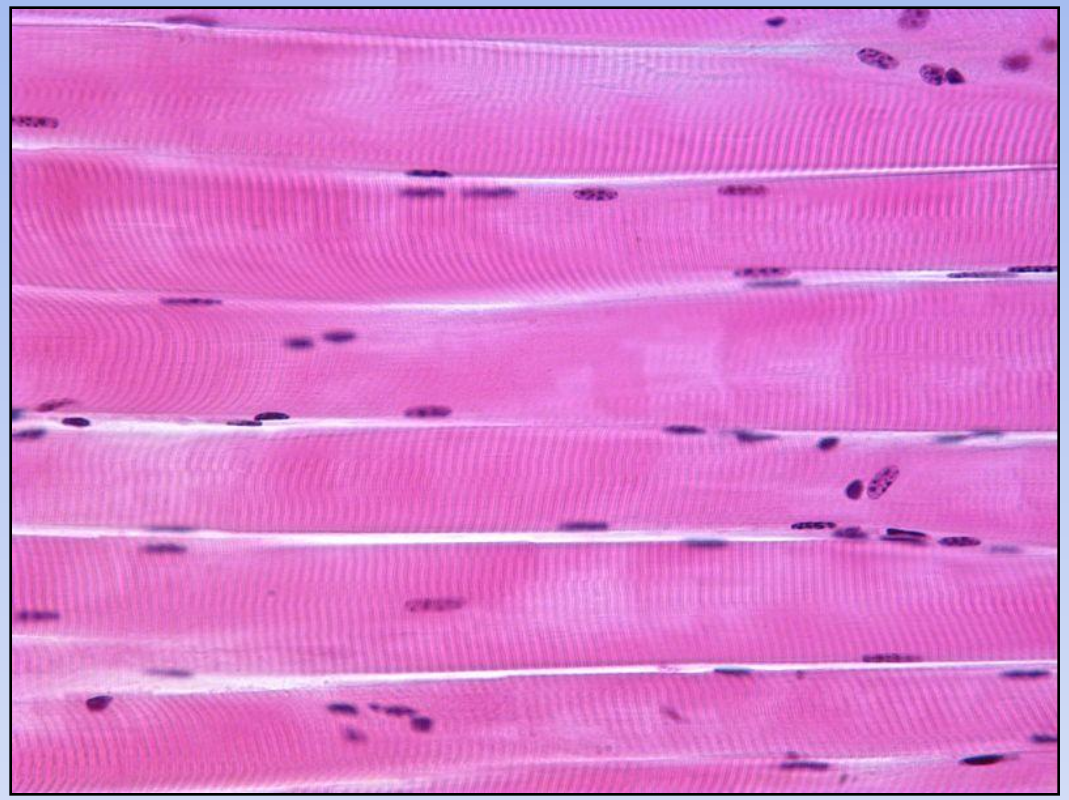
Cardiac

Smooth (not striated)

- ***The Four Primary Tissue Types***
  - **Epithelial**
  - **Connective**
  - **Muscular**
  - **Nervous**

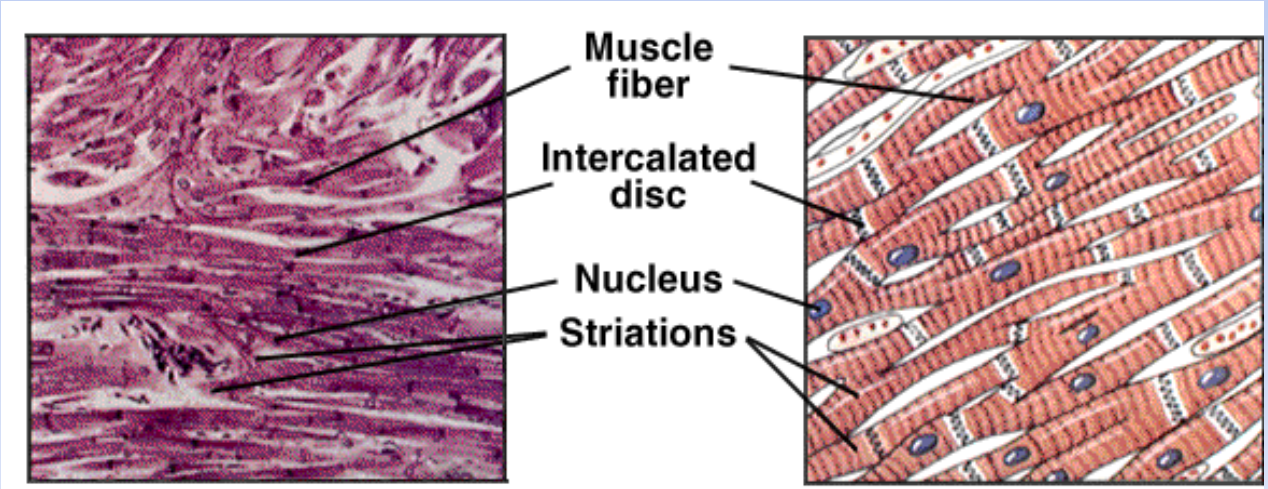
Skeletal Muscle (chap 10)

- Voluntary
- Heavily striated
- Multinucleate
  - periphery of the cell

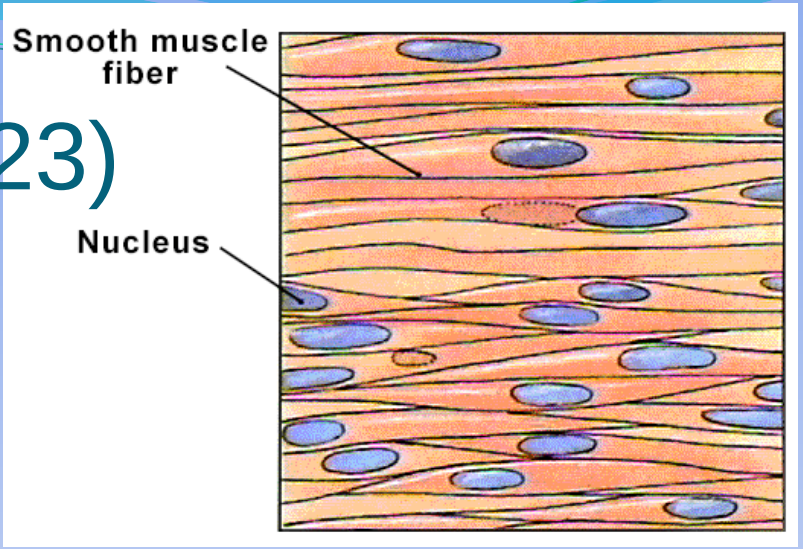


Cardiac Muscle (chap 19)

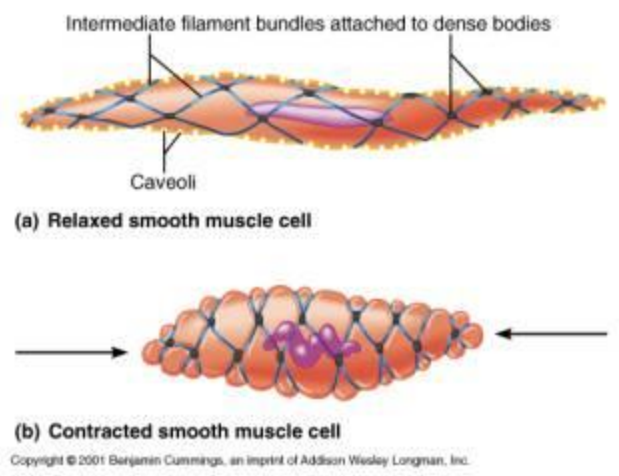
- Heart (Only)
- Involuntary
- Striated, but poorly
- Intercalated disks
- Heavily branched
- Single central nucleus

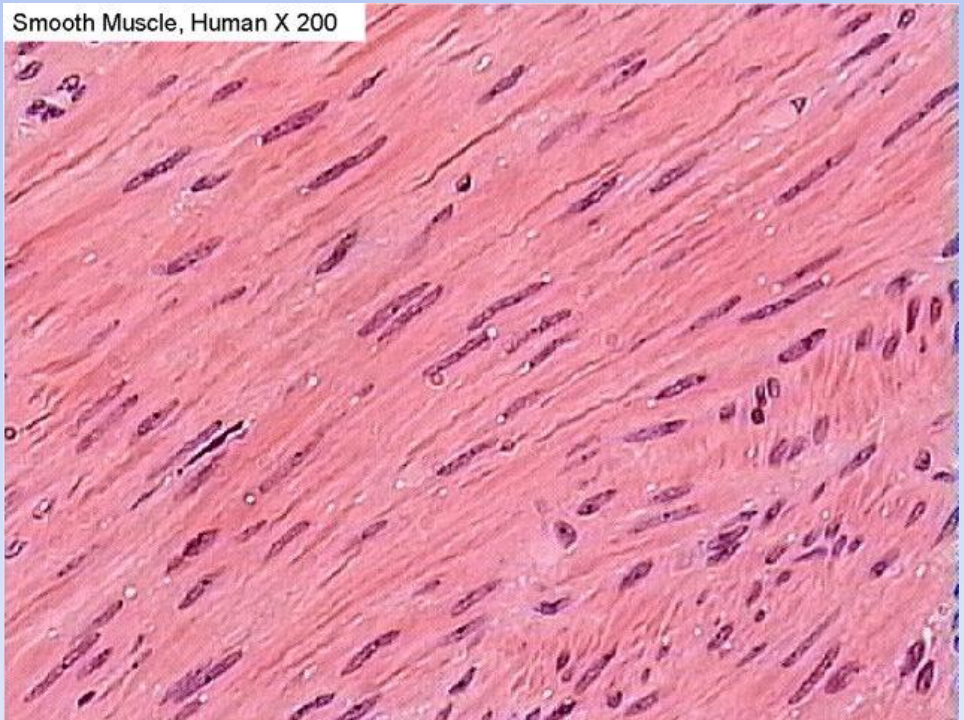


Smooth Muscle (chap 23)



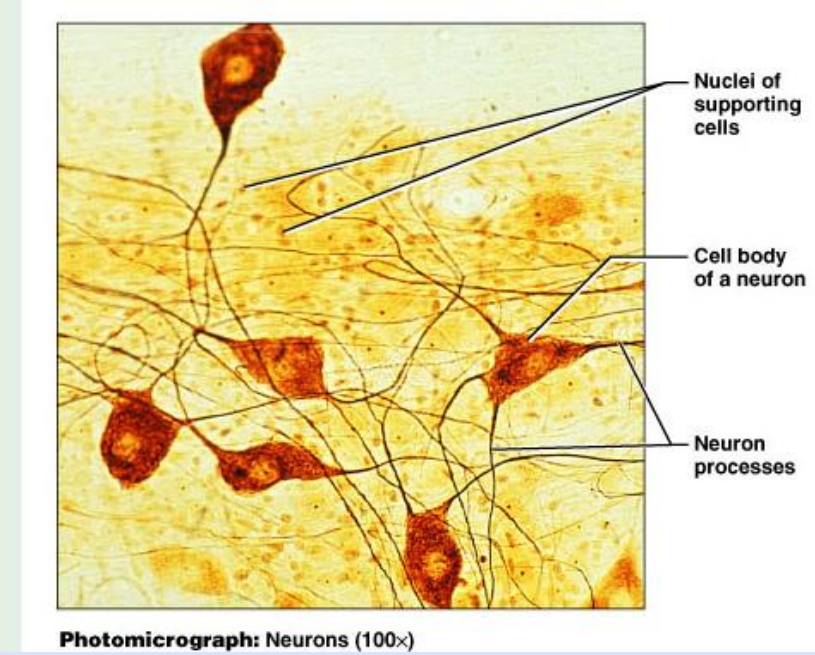
- Involuntary
- Esp. digestive system
- No striations
- Very slow
- Single central nucleus





Nervous Tissue (ch 12)

- Neurons
  - Transmit electrical impulses
- Neuroglia
  - Supportive cells of the nervous system

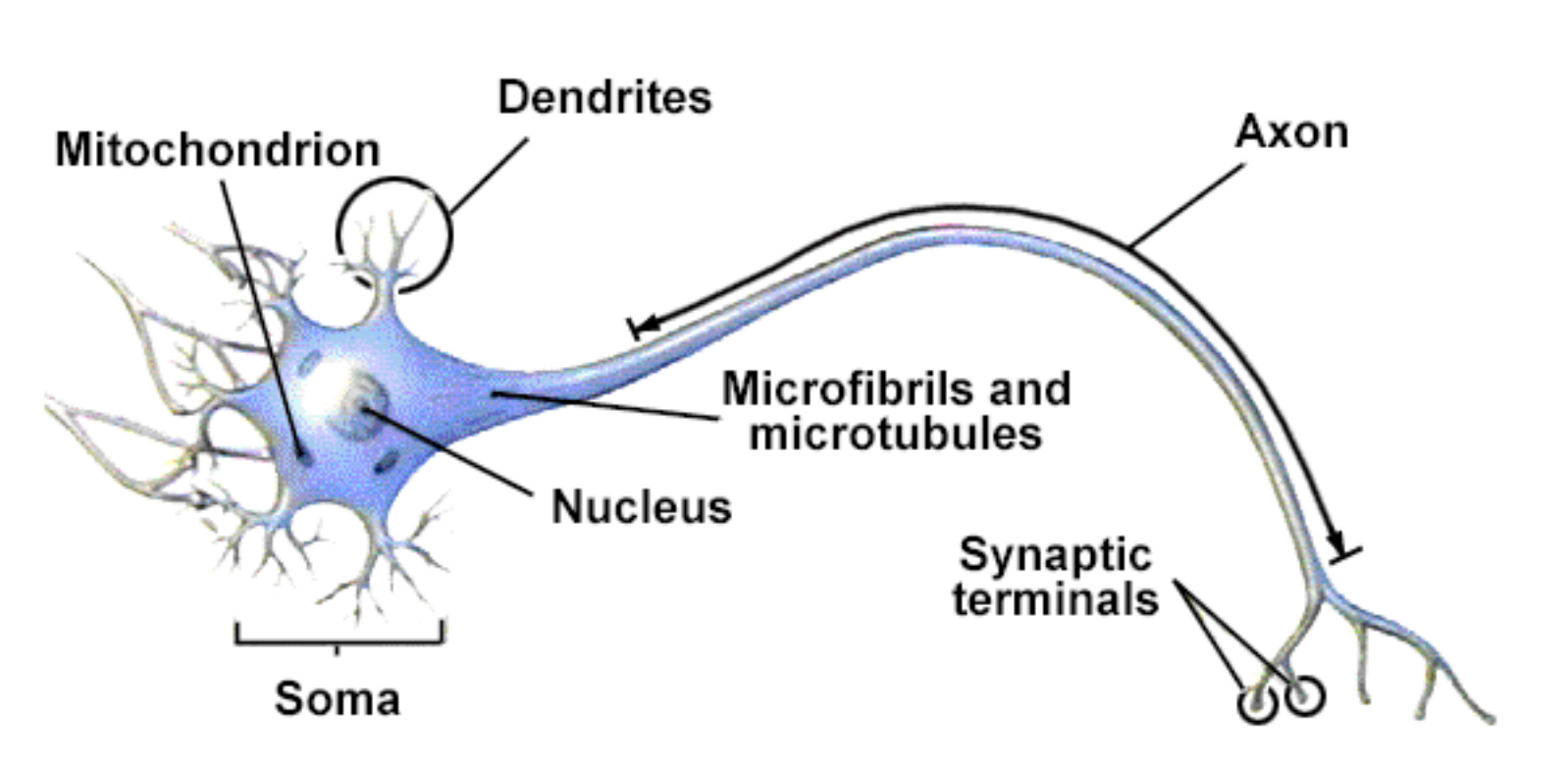


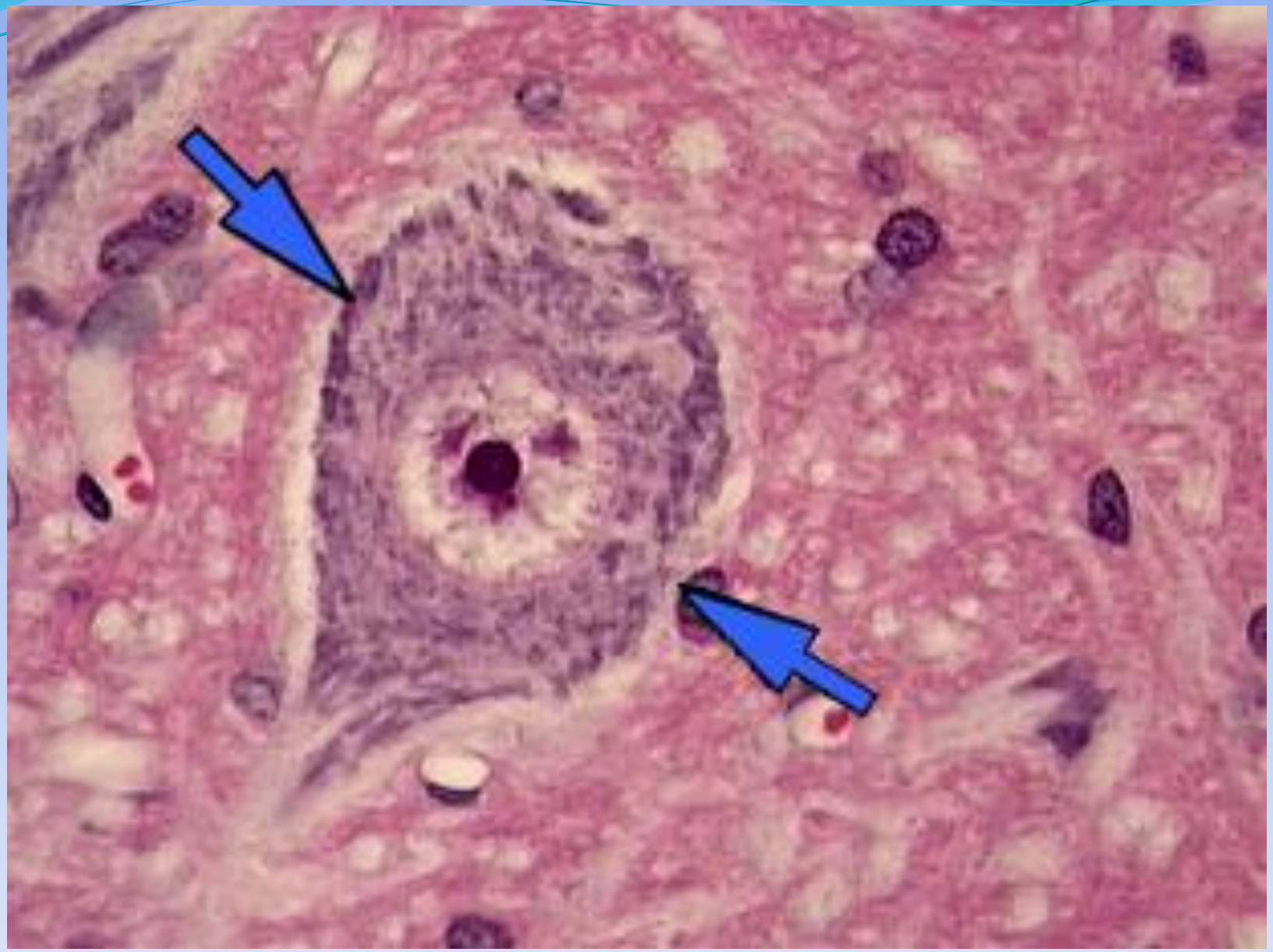
Photomicrograph: Neurons (100×)

•***The Four Primary Tissue Types***

Epithelial
Connective
Muscular
Nervous

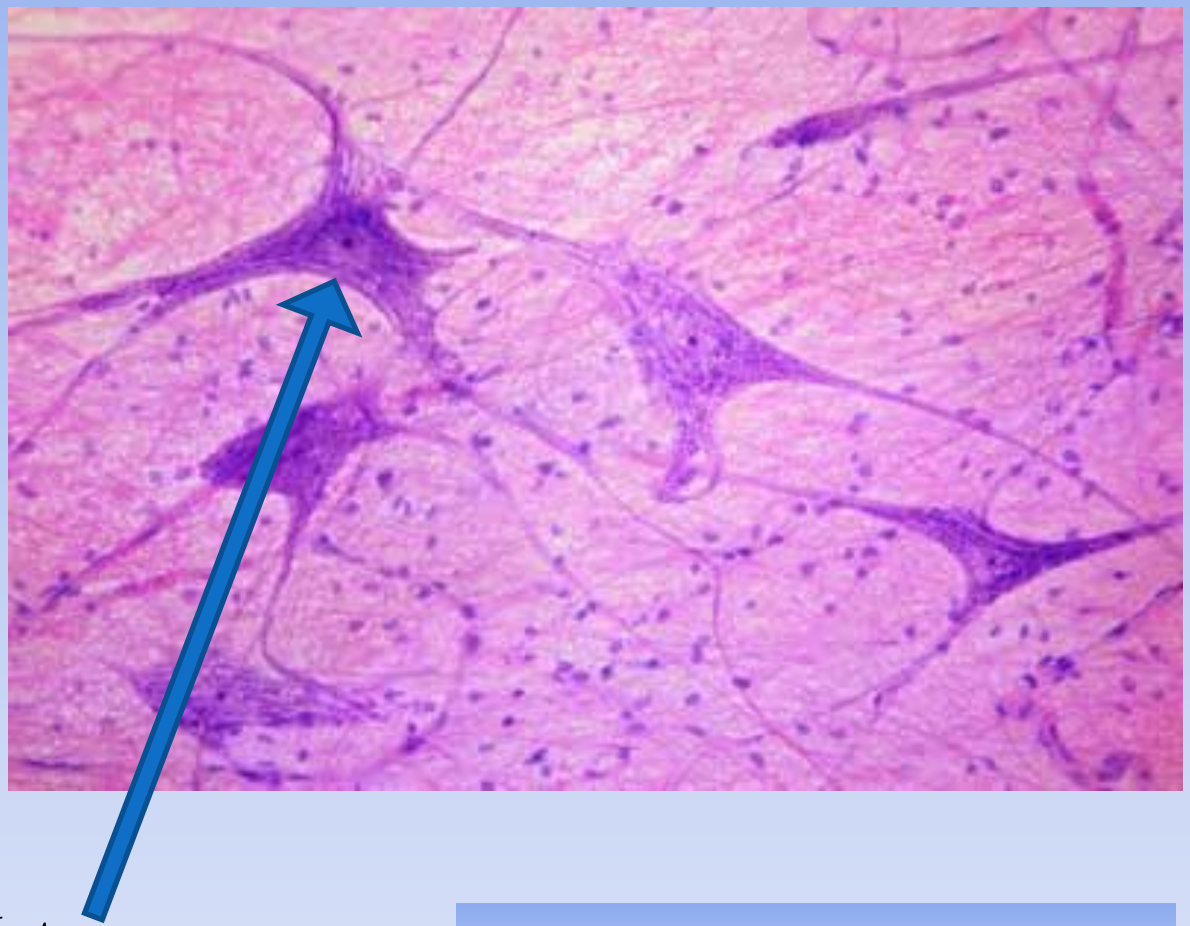
Classic Motor Neuron





Neuroglia

- Support
- Immune
- Transmission
- Nutrition
- Protection



Motor Neuron

All the other nuclei are neuroglia!

Muir Pass, Sierra Nevada